Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 15 (2): 269–273
https://doi.org/10.15560/15.2.269

PENSOFT

Distributional extension for a dry forest species, *Mesoscincus managuae* (Dunn, 1933) (Squamata, Scincidae), on the Subhumid Caribbean versant of Honduras

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Abstract

Mesoscincus managuae (Dunn, 1933) (Squamata, Scincidae) is a typical dry-forest species found along the Pacific versant of Central America from Guatemala to northwestern Costa Rica. Here, we report the occurrence of this species on the Caribbean versant of Honduras, specifically on the Sula Plain, Deparment of Cortés. This is a subhumid habitat similar to others in the Mesoamerican region which have comparable herpetofauna assemblages and where *M. managuae* has already been recorded.

Key words

Herpetofauna assemblages, Mesoamerican Hotspot, San Pedro Sula, subhumid habitats, Sula Plain.

Academic editor: Sebastian Lotzkat | Received 18 November 2018 | Accepted 25 February 2019 | Published 15 March 2019

Citation: Espinal MR, Mora JM (2019) Distributional extension for a dry forest species, *Mesoscincus managuae* (Dunn, 1933) (Squamata, Scincidae), on the Subhumid Caribbean versant of Honduras. Check List 15 (2): 269–273. https://doi.org/10.15560/15.2.269

Introduction

The Mesoamerican Hotspot is the second most diverse in the world and hosts more than 17,000 plant species, including 3,000 of them endemic (Mittermeier et al. 2004). This hotspot encompasses almost all of Central America. It is a region highly vulnerable to extreme climatic events, due to global climate change because of weather stresses, and non-climatic stresses such as effects of demographic pressure and over-exploitation of natural resources (Escobar-Anleu et al. 2018). Within this region, Honduras is projected to be among those countries most affected by climate change (TRAGSATEC 2016). Poverty of the human population and the resultant pressures on natural resources along with extreme weather events are expected to continue to increase. This means that biodiversity will become even more vulnerable (Magrin et al. 2007).

Although amphibians and reptiles are some of the best-known faunal groups in Honduras, much still remains to be known about these creatures in this country (McCranie 2018). Besides, significant habitat loss due to human land use is prevalent over most of Honduras, including the Moskitia, the little Amazonia of Central America (Mora et al. 2018). In Honduras it is estimated that only 20% of the forests remain in a natural state (Galdames et al. 2018). These changes in land use along with climate change are altering the distribution of some species, restricting the habitat of some, and enlarging the habitat of others. There are 59 reptile species endemic to Honduras; several of these species have narrow distributions or are poorly known (McCranie 2018).

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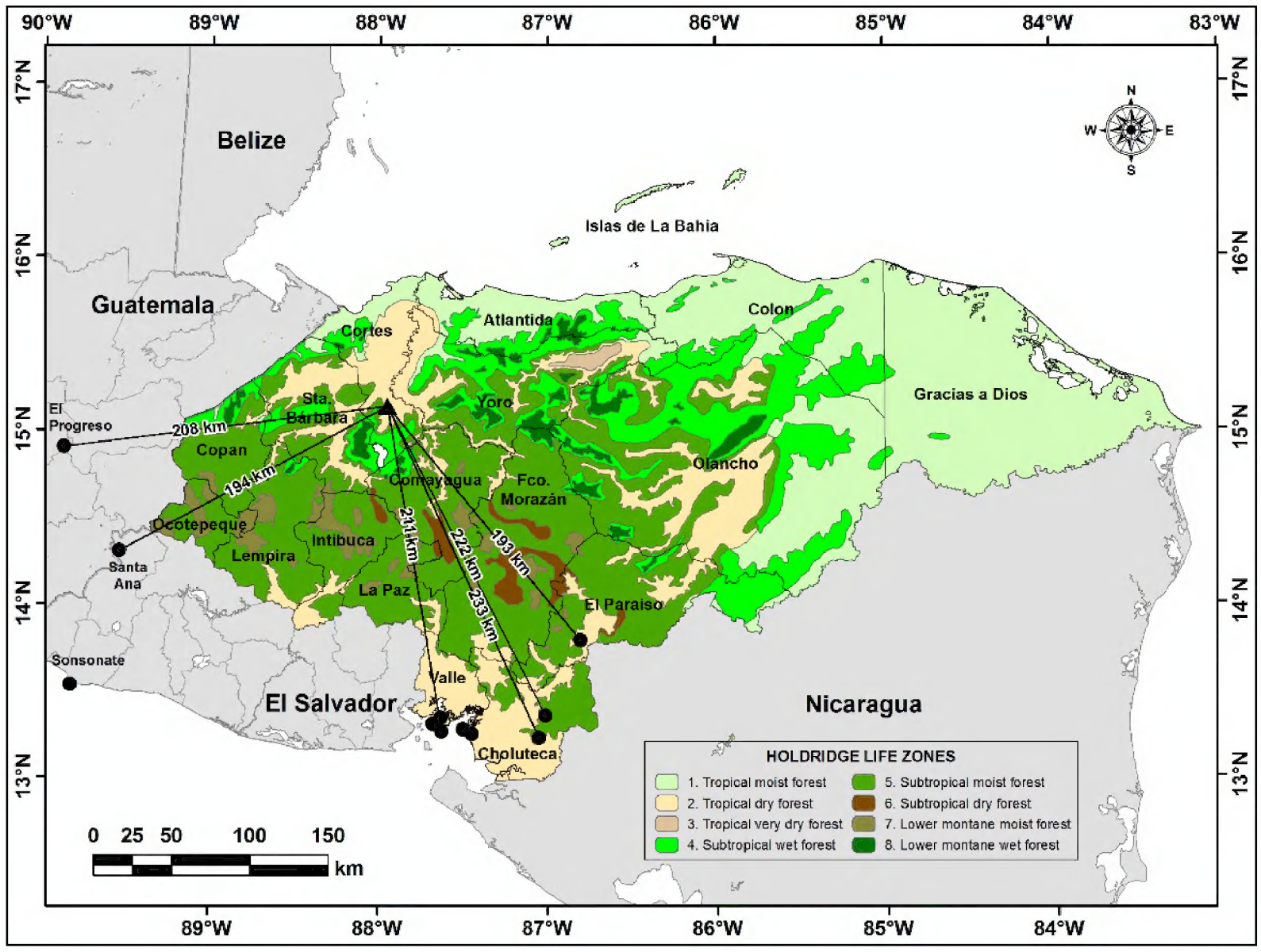

Figure 1. Distributional records for *Mesoscincus managuae* in Honduras: Previously known localities (black circles) and the new locality (black triangle) at El Caracol, Potrerillos, Cortés, with an indication of the airline distances between the new locality and selected previously recorded ones and nearest distance records from El Salvador and Guatemala.

Mesoscincus managuae (Dunn, 1933) is a species of lizard that is found from near sea level to 920 m elevation in the Lowland Dry Forest, Lowland Arid Forest, and Premontane Moist Forest formations on the Pacific versant from east-central Guatemala to northwestern Costa Rica, and on the Atlantic versant near Lagos de Managua and Nicaragua in western Nicaragua (Reeder 1990, McCranie 2018). It was first collected in Honduras in 1977 and remained known from this country based on only 2 specimens until recently, when many individuals were found on several islands in the Golfo de Fonseca (McCranie 2018). As a result, *M. managuae* is now known from several localities in the southern Honduran departments of Choluteca, El Paraíso, and Valle (McCranie 2018). Generally, *M. managuae* is considered uncommon, but it is often found at sites that are highly modified by humans (Savage 2002). In Honduras, this diurnal species has been taken under logs and rocks, in rock crevices, and basking on tree stumps (Cruz et al. 1979, McCranie 2018). All three species of *Mesoscincus* have proved to be difficult to find during fieldwork, which results in a poor understanding of their distribution and natural history (Šmek et al. 2007).

One of the results of an inventory of amphibians and reptiles carried out during 2018 in northern Honduras was the finding of 1 individual of *M. managuae* at a site located on the Caribbean versant of the country, far away from the known distributional range of the species. Here, we report this new locality.

Methods

During fieldwork on the vehicular impacts on fauna along a road (CA-5 North Highway), amphibians and reptiles were inventoried in the community of Caracol at Potrerillos, Department of Cortés, on the Caribbean versant of Honduras (Fig. 1). The area is used to grow corn under some cultivated trees such as loquat (*Eriobotrya japonica*), laurel (*Cordia alliodora*), teak (*Tectona grandis*), mahogany (*Swietenia macrophylla*), jobo (*Spondias mombin*), and mango (*Mangifera indica*). We captured 1 individual of *Mesoscincus managuae*, photographed it, and later preserved it using standard procedures for fluid preservation (Pisani 1973). The specimen is vouchered in the zoology museum at the University of Costa Rica (UCR). A collection permit (No. DE-ICF-065-2018) was provided by the Instituto de Conservación Forestal, Tegucigalpa, Honduras.

Occurrence data for *M. managuae* were obtained from literature (Greenbaum et al. 2002, Savage 2002, Ariano-Sánchez et al. 2010, McCranie 2018). Specimen identification was initially made by comparison with similar specimens and by a literature review (McCraine 2018, Savage 2002). We reviewed 4 specimens of *M. managuae* from the UCR for comparison and confirmation of our specimen's identity. There were no specimens of this species we could review at this time housed at an institution in Honduras. Our identification was verified by Larry D. Wilson and by Gerardo Chavez, curator of herpetology at the UCR.

Figure 2. Capture site of *Mesoscincus managuae* UCR 23168 next to the paved road CA-5 North at El Caracol, Potrerillos, Cortés, Honduras. Photo by M. Espinal.

Results

Several species were identified on 19 October 2018 at our study site and an individual of *Mesoscincus managuae* was captured at 1530 h. The individual was captured on the side of a paved road (CA-5 North Highway) at a site where trees had been cut for the widening of this highway (Fig. 2). The animal was captured when it was running on bare soil that had recently been turned over by heavy equipment.

New record. Honduras, Cortés, Potrerillos, El Caracol (15°09′20.7″ N, 087°56′56.5″ W, 73 m), Mario Roberto Espinal coll., 19 October 2018 (1 adult male, UCR 23168).

Other specimens examined. Costa Rica: Guanacaste, Carrillo, Sardinal, Ocotal, playa Ocotal (10°32′49.92″ N, 085°43′40.08″ W, 10 m), 16 July 1970 (2 adult males, UCR 4528 and 4529); Guanacaste, Santa Cruz, Tempate, Corredor Biológico Diriá, Paraíso, 2.2 km E (10°25′09.84″ N, 085°41′47.04″ W, 100 m), 24 June 2005 (1 adult female, UCR 18167); Puntarenas, Puntarenas, Cobano, Reserva Natural Absoluta Cabo Blanco, headquarters area (09°34′42.24″ N, 085°06′44.28″ W, 300 m), 2003 (1 juvenile, UCR 19758).

Identification. The median row of expanded dorsal scales that extends from the shoulder region to the base of tail distinguishes the genus *Mesoscincus* in Honduras (McCranie 2018). Our individual of *M. managuae* (UCR 23168, Fig. 3) matches the unmistackable coloration of this species as described in the literature. This coloration separates this species from other members of the genus, especially from *M. schwartzei* (Fischer, 1884), which occurs in southern Mexico, Belize, and Guatemala (Percino-Daniel et al. 2012). More technically, our specimen has movable eyelids with no translucent disk in the lower eyelid, the head covered by large plates, a single frontal scale and a single interparietal, the paired supranasals (internasals) in contact medially, 2 frontoparietals, and the body covered by uniform cycloid scales; measurements are: snout–vent length (SVL) = 124 mm, tail length (TL) = 124 mm.

Discussion

Mesoscincus managuae is of moderate size with a maximum recorded SVL of 125 mm (in Honduras: previous maximum recorded SVL = 110.0 mm) (McCranie 2018). Our individual (UCR 23168; SVL = 124 mm) is now the largest individual captured in Honduras.

The new locality for *M. managuae* is the first on the Caribbean versant of Honduras and extends the known range of this species to the north of the country, ca 193 km in a straight line from the nearest records in the department of El Paraíso, ca 211 km from those in Valle, and ca 222 km and 233 km from those in Choluteca (Fig. 1). All previous localities are from the dry forests of southern Honduras. The distances between records from Guatemala (208 km) and El Salvador (194 km) to the new locality in Honduras reported here are similar to

Figure 3. *Mesoscincus managuae* UCR 23168 from El Caracol, Potrerillos, Cortés, Honduras. Photo by M. Espinal.

the distances between this and previous localities in the south of the country.

Amphibians and reptiles of Honduras are a good example of the diversity and endemism that characterizes the Mesoamerican Hotspot (Solís et al. 2014). With 401 species in Honduras, there is an amazing number of amphibians and reptiles in the country. This is more amazing in that 111 of these are endemic (McCranie 2015). The degree of endemism of the herpetofauna of Honduras is the highest in Central America (Wilson and Johnson 2010). Of the 107 species of lizards that exist in Honduras, 35 are endemic. Several other species have restricted geographic ranges. *Mesoscincus manguae* has a Mesoamerican distribution, which appears to be primarily restricted to the dry forests of the Pacific versant (McCranie 2018). The mountainous topography and its effect on climate has resulted in an extensive mosaic of ecosystems. For example, some particular associations within the life zones of the country exist in patches such as the Tropical Dry Forest and particularly the Tropical Dry Forest with good soils and presence of dry period (s-T / S1-Ps), according to the Holdridge Life Zones System (Holdridge 1967). It is in this life zone in southern Honduras and on the Atlantic versant of Nicaragua where *M. manguae* has been found. Although the new record of *M. managuae* is separated from the other Honduran localities by many mountains and kilometers, its location on the Atlantic slope of Honduras is in the Tropical Dry Forest (s-T / S1-Ps of Holdridge 1967). The capture of the individual in the s-T / S1-Ps corroborates that this is a dry-forest species, as reported by other researchers. The atypical, patchy distribution of this species, reflective of the patchiness of some ecosystems, is similarly known for the only endemic bird in Honduras, *Amazila luciae* (Lawrence, 1868), which is restricted to interior dry valleys of the country (Mora et al. 2016).

Wilson and McCranie (1998) analyzed the herpetofauna of the subhumid forests of Middle America and described the Sula Plain as an extensive north–south structural depression between the Sierra de Omoa and the Cordillera Mico Quemado and Montaña El Tiburón. The subhumid portion of the Sula lower valley lies at elevations from below 100 to about 200 m. The reptilian fauna of this valley belongs to the Middle American Generalized Track, which evolved in situ under the Miocene–Pliocene uplift of the main mountain axis of the area along with the associated climatic changes that gradually fragmented a widespread mesic Middle American herpetofuana into 3 assemblages (Wilson and McCranie 1998). According to this model, *M. managuae* can be expected to occur at the Sula Plain. This means that although the distribution expansion presented herein is extensive, *M. managuae* should probably not be expected to occur everywhere between the known occurrences but instead will likely be found to be very restricted to the subhumid habitats as predicted and described by Wilson and McCranie (1998).

There is still much to learn about *M. managuae*. It is presumed to be oviparous, diurnal, and terrestrial, and it has been found mainly under rocks (McCranie 2018). The first report of this species in Honduras was based on a specimen found under a rock pile in a disturbed area behind a house (Cruz et al. 1979). One individual, collected more recently in Orealí, El Paraíso, was found under a large rock in scrubby vegetation on a hillside used for crops of corn and mango (McCranie et al. 2014); these researchers reported that the lizard disappeared several times by crawling under adjacent rocks when chased and that it was finally caught from under the rock where they had first sighted it (McCranie 2018). One individual in Guatemala was found under a rock in heavily degraded subtropical thorn-scrub forest (Šmek et al. 2007). A juvenile was found under a fallen termite nest in disturbed forest at León, Nicaragua (Sunyer and Köhler 2007). The first country record for El Salvador was an individual found under a log in tropical dry forest (Greenbaum et al. 2002). The first documented locality for Guatemala was 1 individual that crawled through a dry gulley in Tropical Dry Forest (Ariano-Sánchez et al. 2010). Besides these reports, practically nothing else is known about this species.

Our new data comprises 3 main contributions to the knowledge of *M. managuae*: a new record at the departmental level (Cortés; Fig. 1), an extension of the species' geographic range by about 200 km from the nearest previously known occurrence, and a new northernmost

record of the species. Our record is also from a subhumid habitat but on the Caribbean versant of Honduras. Our new data on *M. managuae* demonstrates that increased efforts are needed to better know the geographic distribution of Honduras's biodiversity.

Acknowledgements

We thank Larry D. Wilson for confirming our specimen's identity as well as for providing advice and corrections regarding the manuscript. We are grateful to Gerardo Chavez for confirming our identification and for providing data of and access to specimens at the UCR collection. José Mario Solis provided the measurements of the specimen. We thank Jorge Luis Funez Medina for preparation of the map and Profesionales de la Construcción (PRODECON) for financing the fieldwork. Sebastian Lotzkat and Javier Sunyer, as well as Robert Forsyth, made valuable comments and suggestions for the improvement of the manuscript.

Author contributions

ME found the specimen at the new locality (Cortés) and collected the data; JM reviewed specimens at UCR and elaborated the manuscript. JM and ME studied maps of Holdridge Life Zones to determine the ecosystem of collected individuals. Both authors read, edited, and approved the manuscript.

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